

EXPERT'S OPINION

SMART AND SUSTAINABLE DEVELOPMENT IN FOREST INDUSTRY

The global demand for pulp is shifting and the industry is under pressure to perform. Bioproducts, packaging materials and other wood based product markets are now in turning point while wood, biomass and other raw material supply is declining. Therefore trends in the industry leans to sustainability thorough efficient processes and optimization solutions.

The pulp & paper industry is by nature very capital intensive and companies must always be on the lookout for ways to get the best return of their investments. Better performance in competitive situation needs deep understanding about alternative market scenarios and dynamics in reality.

EXPANDING MARKETS PROVIDES VERSATILE GROWTH POSSIBILITIES

Despite of a large range of wood products, we see that the potential of forest industry has not been fully exploited. While digitalisation strongly escalates, the only declining product range is paper used in media and communication sector. The global market demand for other wood based products is heavily increasing. For example a number of educated and wealthy people is growing which brings up the emerging need of high quality hygiene products. By alone this sets already a continuous demand for pulp production. On the other hand the pulp industry is highly competitive and therefore pulp mills needs to optimize their processes and foresee upcoming trends.

SUSTAINABILITY AS ONE OF THE RISING TRENDS

Quality and other product related features are playing high importance in consumer's minds. We can already see market based differentiation and product tailoring in pulp industry.

Differentiation has already accomplished when processing different types of wood. Refined and branded end products are fascinating buyers, also markings of important certificates has established competitive edges between pulp manufacturers. Certificates are an integrated part of pulp mills business logics. With foresting certification the industry can proactively respond to market demand and challenges.

"Sustainability has transferred in wood processing industry breaking the old ways of manufacturing."

Sustainability has transferred in many industries breaking the old ways of manufacturing. New products such as biodiesels, biomaterials, chemicals and composites are currently in intensive developmental phase. The trend is to discover suitable by-products from production flow,



Short market review written by Petteri Pihlajamäki, Business Consultant from Pöyry, a world leader in forest industry consulting and engineering.

which could be refined, developed forward and utilized. One of these ingredients is lignin, which constitutes 30% of non-fossil organic carbon and 20-35% of the dry mass of wood. Development of new revenue besides normal business is very encouraging and interesting. Sustainability not only preserves environment and raw material but also creates profit. Probably therefore the global commitment to sustainability is serious and has already made great progress in improving manufacturing practices.

Besides, a new trend is to enlarge variety of usable raw materials. We see a lot of potential with larch that grows widely in Russia and Canada. It is only a question of time when all production lines can process a larger variety of woods in order to produce different types of pulp and by-products. Pöyry aims for pulp mills optimal lifecycle efficiency, whilst enhancing the operational performance and minimizing the environmental footprint.

Therefore we believe, that by research, developing, automation and optimizing processes a higher value is created, and eventually the full potential of forest industry can be harnessed.

PÖYRY IS A WORLD LEADER IN FOREST INDUSTRY CONSULTING AND ENGINEERING

For more than 50 years, Pöyry has been successfully executed projects for the pulp & paper industry all over the world.

In total, the company has involved in 90% of the world's largest pulp mill designs, planning and executing

factories with optimized life cycles and minimal environmental impacts.

Pöyry has in-depth knowledge of the full forest industry value chain ranges from raw materials and production through to end products.

CHIPSMART™ MAKES THE PROCESS EVEN MORE PROFITABLE

Accurate data of the raw material quality is a valuable asset. In wood processing, chip quality is a key parameter for chipping and post processing management. It provides the means to keep the pulp production process free of disturbances and functioning at best possible capacity. Process optimization enhances both profitability and quality of end-product.

The **ChipSmart™** optical measurement device is designed for real-time measurement of raw material quality. It enables the monitoring of end-product quality, the condition of chipper knives and the quality of sellable and/or purchased chips. Analysis results are available in real time in accordance with the SCAN-CM 40:01 standard. By providing data in large scale, it optimizes the overall production process.

CHIP MEASUREMENT IS A PART OF PROCESS OPTIMIZATION

ChipSmart™, located after the chipper, continuously measures chip quality. The camera takes a picture of the chip flow and sends the data to the PC unit for color analysis. The result shows data of chip quality, such as chip surface brightness, extent of bark and other impurities, changes of chip surface moisture, changes of chip size classification and material volume flow on chip conveyor. The measurement data can be connected to the **WoodSmart™** optimization system used in the wood room or shown in the control room on a separate display. "In case of notable changes in quality, all necessary adjustments can be accomplished. For example chipper knives can become worn out. After changing new knives, the

process remains efficient. Furthermore, the reports provide information on averages and trends by sample batch, shift, day, month etc. All data can be analyzed later as well", says Teknosavo's CEO, Hannu Hämäläinen.

IN A HEART OF HIGH QUALITY AND SUSTAINABILITY

The ChipSmart™ can also be used to analyze manual samples or the quality of by-product chips sold at the sawmill. Quality management is a normal process for pulp mills but it is inefficient to maintain manually. "Data of the chip properties are important, when it comes to profitable manufacturing and sustainability aspects. This technical solution enhances whole quality chain and declines the costs, bringing real competitive edges to the pulp mill," continues Mr. Hämäläinen.

The ChipSmart™ system consists a chip classification unit, a camera and optics unit, a display screen, and a PC unit housing the analysis and maintenance software. The type of the sampler (2D or 3D) and treatment of the sample chips after measurement can be configured individually for each industrial end-user.



Wood chips at Södra Cell Mönsterås

CASE SÖDRA CELL

OPTIMISATION CREATES VALUE

Södra Cell is one of the world's largest market pulp supplier, with a total annual production of 1.6 million tonnes. The company is constantly looking for improvements how to get the most from their wood to optimise the sustainability and performance of the products. Södra Cell is located in Sweden and is currently investing heavily in all three of its mills, Mörrum, Värö and Mönsterås, to reinforce its market position as a global leader in market pulp.

SÖDRA CELL MÖRRUM UNDER REFURBISHMENT

Mörrum pulp mill produces high-grade pulp with unique properties. The investment is the second stage of a long-term initiative at Södra Cell Mörrum, and will escalate the mill's capacity by 45,000 tonnes. During the 2014-2020 period, Södra Cell Mörrum will progressively begin to



Pulp mill Södra Cell Mörrum

provide larger volumes by increasing capacity from 380,000 tonnes to 470,000. Moreover, 200,000 tonnes of the volume will consist of high-quality dissolving pulp. On top of the increased capacity, the investments will contribute to higher pulp quality, more effective washing results, and lower chemical consumption on the pulp line.

REAL TIME QUALITY CONTROL LEADS TO EFFICIENCY AND PREMIUM QUALITY

At present, the focus is on quality development and optimising production. Södra Cell highlights sustainability in all its operations. For resource-efficient production with direct savings of chemicals and energy, all processes must be optimised. To ensure key parameters for chipping and post processing management, Teknosavos' ChipSmart™ 3D chip quality surveillance system was installed in Mörrum pulp mill. This enables monitoring of end product quality as well as quality of sellable and/or purchased chips.

The analysis results are now available in real time in accordance with the SCAN-CM 40:01 standard. ChipSmart™ 3D data provides continuous optimization of overall production along with deeper information, such as the condition of chipper knives. It complements the pulp mills enhanced total control and regulation of product quality, resulting in less work, homogenous quality and savings. Hence, Mörrum mill has uplifted its production to the next level.

ABOUT SÖDRA CELL

- Södra's first pulp mill started up in 1938
- Currently one of the world's largest market pulp supplier, with a total annual production of 1.6 million tonnes.
- Södra Cell is part of Södra Skogsägarna ekonomisk förening. The main part of the raw material comes from the forests of Södra's members.
- Besides hardwood pulp from birch, 90% of the production consists of softwood pulp.

MÖRRUM MILL KEY FACTS

- Location: southeast of Sweden, delta of the Mörrum river, proximity to the harbour in Karlshamn.
- Annual production capacity: 460,000 tonnes
- Product range: Long-fibre pulp, Short-fibre pulp, Textile pulp
- Number of employees: 335

GREEN GOLD INTO REAL GOLD

In global wood processing, the level of optimization has been low until now. Teknosavo WoodSmart™ control system is developed for automated control of pulp wood debarking. This innovative optimizing system, equipped with patented online measurement devices, maximizes the whole process capacity from gate to digester. Versatile savings in the wood processing business is literally turning green gold into real gold.

PULP MILLS ARE CURRENTLY LOSING WOOD UP TO 4% EVERY YEAR

On a yearly level in Finnish circumstances, 25 million cubic metres of pulpwood go through the system. Generally on this scale, annual wood loss is currently 1-4 % per pulp mill. For a single debarking line this can mean up to 1 million euros profit decline. Equipped with the most modern laser and camera technology **WoodSmart™** system can create significant savings by diminishing the loss. Currently 80% of Finland's raw wood debarking processes are already optimized with Teknosavo's devices.

HIGHLY DEVELOPED FULL SYSTEM CREATES BENEFITS IN SEVERAL STAGES

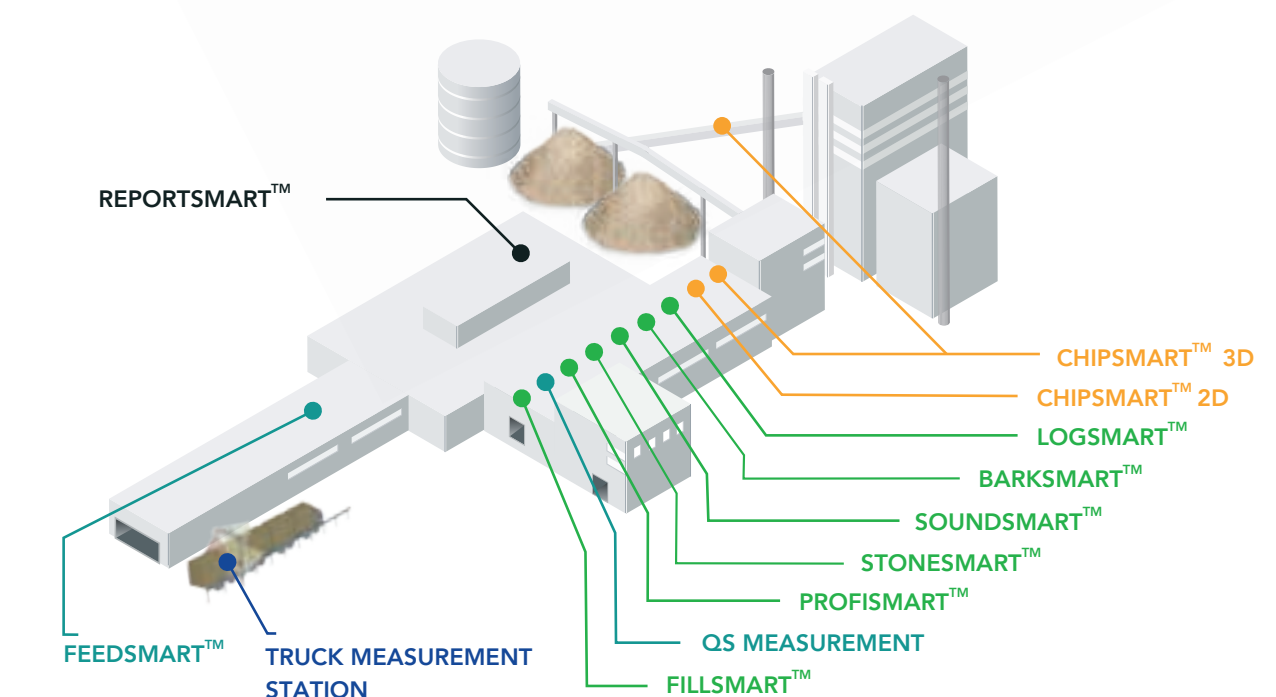
Instead of continuous manual control, the nature of work shifts to monitoring in debarking plants. WoodSmart™ system calculates the best control variables for debarking and maintains the wood flow as stable as possible. Regardless of the wood species, logs are debarked precisely to the optimum level of required cleaning. The advantages of using the full system with all smart devices are countless as each of them has a different purpose, even if they are targeting to the same goals.

STABILITY AND EFFICIENCY THROUGH PRECISE DATA

The WoodSmart™ devices are measuring the whole debarking process, while wood handling automation and optimization can be started already before debarking. The precise wood material flow information can optimize the process to the highest performance level. Therefore, all incoming raw material faces the first check at the truck station located near feeding gate. Thereafter, **FeedSmart™** laser begins measuring wood flow on the drum conveyor on its way to debarking.

While wood flows on conveyor, QS Measurement system assesses a small selected sample (1-2 %) of wood fed to the debarking feed table. QS Measurement is integrated into the production line and informs operator about logs that do not fulfill the size limit or have technical/quality defects. The system sustains homogenous raw material and high quality fiber. QS Measurement provides savings from reducing significantly manual work.

Next, **FillSmart™** measures the drum filling degree with optical data. This real-time analysis of the image data is used in controlling the correct drum filling degree to minimize fiber loss in debarking. The greatest benefit of the optical drum fill measurement is that changes in wood quality do not affect the realistic filling degree value.



ProfiSmart™, an optical measurement device, continuously assesses the percentage of wood in relation to bark on the conveyor. The system provides real-time analyses of the bark measurement data for operators. The data can be used to control debarking so that unnecessary wood loss can be minimized. As a further step in de-icing control, **SoundSmart™** calculates the energy required to de-ice the wood. This way energy can be saved. Furthermore, **StoneSmart™** system alarms in case stones are detected at the chipper infeed conveyor. This prevents machine injuries in chipper.

BarkSmart™ device in chipper sends wood cleanliness data to the control room for operators. The data can be used in debarking control to achieve desired optimum standard of cleanliness. Correct log cleanliness reduces chemical costs during pulp processing as well as wood loss in debarking. Importantly, accurate cleanliness data enables precise control of debarking for different seasons of the year.

LogSmart™ is the laser device measuring wood flow on the drum chipper line. LogSmart™ assesses the diameter, sweep and log volume before chipping to prevent chipper chute plugs. If too much wood is simultaneously fed to the system, for example a log is too big in diameter or too crooked, the system alarms and stops the line.

SUSTAINABILITY CREATES SAVINGS

Exceptional optimization solutions of wood handling automation, debarking control and log measurement, improve productivity in many ways. Automation brings extra resource and ensures high utilization rate. It also minimizes maintenance costs and idle time created by malfunctions.

Correct cleaning degree is a very important factor in pulp manufacturing. Raw material is expensive and by decreasing material loss, significant savings can be acquired even with small reductions in use of chemicals and energy. Therefore high efficiency provides not only monetary value but preserves precious natural resources.

INFO

WoodSmart™ pays the investment back in one year. Debarking of softwood with 1% decrease in wood loss creates annual savings of 0,7M€ in raw material and energy.

80% of Finland's round wood debarking is optimized with WoodSmart™ system.

ENSURE FULL CAPACITY 365 DAYS A YEAR

Teknosavo Smart solutions can be completed with versatile maintenance services, such as spare part and repair service, maintenance visits, phone- and remote assistance service and other customer related services. We provide operational reliability and efficiency with a comprehensive service contract. This will ensure a carefree, optimal functionality and timely maintenance for your device.

PHONE AND REMOTE SUPPORT SERVICES 365

Our agreement customers can leave the maintenance and support requests, related to the applications, every day of the week. Technical advisory services supports in maintenance of the measuring equipment in daily basis, around the year. With telemonitoring we are able to assist in disruption situations to normalize operations as quickly as possible.

SPARE PARTS AND REPAIR SERVICES

The response time for spare part deliveries for stock products is only 2 days for our contract customers. Furthermore, spare part supply can be made as an emergency delivery, when customer gets it on the same day. Genuine spare part and expert maintenance ensures long service time of the investments.

MAINTENANCE VISITS

Our service agreement covers all service visits, whether it is the annual plan or emerging need in telemonitoring. This will prevent production disruptions and assure the best benefit from your investment.

STATUS MAPPING

We monitor our contract customers' diagnostic and measurement data to ensure high performance. Reports to be provided monthly or according to the need describe the current performance of the production lines. These reports give recommendations to ensure the optimum level of the production line. Along with status mapping, maintenance measures are also carried out, such as deletion of oversized log files.

"Maintenance agreement guarantees the continuous monitoring of the measuring device's operation without active requests. This way problem situations can be foreseen and avoided."

MANAGE YOUR COSTS

Save personnel resources, extend the service life of measurement devices and ensure full capacity.

STEADY QUALITY

Properly serviced measuring devices guarantees optimal production, the quality of the end product, as well as a reduction in the number of complaints.

CONTINUOUS REMOTE SUPPORT

Fault and support situations can occur at any time. Our flexible is at your service, every day of the year.

EFFICIENCY BY PREVENTION

The maintenance contract helps you to avoid unplanned downtime and faults and to maintain full production power.



RENSERIKONFERENS 2016

Teknosavo presented WoodSmart™ optimizing system and StoneSmart™ stone detector in Renseri Conference, Sweden

Renseri Conference is a biennially held event for wood, pulp and paper industry professionals. It gathers together software and machinery manufacturers and the latest technological developments of the industry. This year, the conference's main topic was the Smurfit Kappa Kraftliner's modernized wood processing in Piteå, Northern Sweden.

The event showcased Teknosavo's WoodSmart™ optimizing systems, used in two of the plant's debarking lines, as well as StoneSmart™, a stone detector system designed to prevent machinery malfunctions in the chipper.

MEET TEKNOSAVO

TRADE FAIRS

SAESCIMUSCIT, DUNT

18th - 20th November 2015

Atae saescimuscit dunt, eostinctur aliberchiti ut lis adit veliti soluptior sum quibusam dolorio dem dolestiostis doluptaquo tem ente et magnis debis velecto.

SAESCIMUSCIT, DUNT

12th - 14th April 2016

Loruptatem quiassum aliquo mo mo dem la dolor reheniet reheniendis volenihicto dest. Pit perorio nsequis minvendi dolut anisquia dolore simi, con restis ipsam.